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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,356	04/08/2004	Samaresh Mohanta	100770.0020US1	1203
34284	7590	03/06/2007		
Robert D. Fish Rutan & Tucker, LLP 611 ANTON BLVD SUITE 1400 COSTA MESA, CA 92626			EXAMINER WILKINS III, HARRY D	
			ART UNIT	PAPER NUMBER
			1742	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/06/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/821,356

Applicant(s)

MOHANTA ET AL.

Examiner

Harry D. Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 26 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-20 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-16 and 21-25 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/14/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-25, drawn to an electrolytic cell, classified in class 204, subclass 263.
 - II. Claim 26, drawn to a method of immobilizing lead, classified in class 423, subclass 94.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions operate in completely different manners to achieve completely different results. One is an apparatus for an electrochemical reaction, the other is a method for forming insoluble lead chloride by treatment of soil with ferric chloride.
3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Martin Fessenmaier on 27 February 2007 a provisional election was made without traverse to prosecute the invention of group I, claims 1-25. Affirmation of this election must be made by applicant in replying to this

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Office action. Claim 26 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 4-16 and 21-25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Edson (US 4,585,539).

Edson anticipates the invention as claimed. Edson teaches (see figures 1, 2 and 6, and at least col. 1, line 66 to col. 2, line 35 and col. 6, lines 37-47) an electrolytic cell including a first container (24) containing a catholyte, with a cathode (18) disposed within the catholyte, a pump (82) fluidly coupled to the first container and moving the catholyte across the cathode at a predetermined flow velocity, a second container (28) containing an anolyte, wherein the second container is at least partially disposed within the catholyte, wherein the second container included a separator (22) that separated the anolyte and catholyte, with an anode (20) disposed within the anolyte. The cathode

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and the second container are positioned relative to each other such that a flow path between the second container and cathode is formed from which metal from the catholyte is deposited onto the cathode. With respect to the limitation that the deposition occurs at non-current limiting, Applicant describes (see page 4, lines 1-5) that this condition is proportional to the Reynolds number of the catholyte flowing past the cathode as well as the metal ion concentration. Thus, because Edson teaches using turbulent flow of the catholyte, it inherently produces the claimed "non-current limiting conditions".

With respect to the limitation that the catholyte comprises "a metal in complex with a complexing agent", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating with a metal-complex containing solution.

Regarding claim 12, Edson teaches (as above) an electrolytic cell including an anode, cathode, an electrolyte, a pump fluidly connected to the electrolytic cell and moving the electrolyte between the anode and cathode at a predetermined flow velocity and wherein the anode and cathode were positioned such that a flow path was formed between the anode and cathode such that metal was deposited on the cathode at non-current limiting conditions at the flow velocity.

Regarding claim 21, Edson teaches (as above) an electrolytic cell including an anode, cathode, both in electrical contact with an electrolyte, and a pump fluidly connected to the electrolytic cell and moving the electrolyte within a flow path located

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between the anode and cathode at a predetermined flow velocity such that metal was deposited on the cathode.

With respect to the limitation that the catholyte comprises "a metal in complex with a complexing agent, wherein the metal is present in the electrolyte at a concentration of less than 5000 ppm", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating with a metal-complex containing solution.

With respect to the limitation that the metal "is plated onto the cathode in form of a smooth film", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating to form a smooth film of deposited metal.

Regarding claim 2, the cathode chamber included an inlet and an outlet, the outlet being positioned such that catholyte leaving the cathode chamber has contacted the separator (membrane).

Regarding claim 4, this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating with a sulfuric acid and lead-EDTA complex solution.

Regarding claim 5, Edson teaches (see col. 5, lines 57-63) making the cathode from titanium and the anode from lead.

Regarding claim 6, Edson teaches (see figure 6) providing the anolyte to the anode chamber from an anolyte circulation tank (83). With respect to the limitation that the anolyte comprises "sulfuric acid", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating with a sulfuric acid solution as the anolyte.

Regarding claims 7 and 15, Edson teaches (see Example 1) using a diaphragm made of microporous aluminum oxide.

Regarding claims 8, 9, 23 and 24, Edson teaches (see col. 11, lines 4-19, particularly lines 13-15) that the apparatus was capable of operating to remove metal from the catholyte solution down to about 2 ppm.

Regarding claim 10, Edson teaches (see col. 3, lines 16-19) using a velocity of at least 3 feet per second (0.9144 m/sec).

Regarding claims 11, 22 and 25, the apparatus of Edson would have been capable of operating at conditions (different pump speed) such that the metal from the solution was deposited in any desired form, including a smooth film, a powdery deposit or a dendritic form.

Regarding claims 13 and 14, the cell of Edson (see at least figure 6) included a cathode disposed in a cathode container, an anode and anolyte disposed in an anode container, wherein the anolyte was circulated between the anode container and an anolyte circulation tank, wherein the anode chamber is at least partially disposed in the cathode container.

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Regarding claim 16, the apparatus of Edson (see at least figure 6) included a design such that catholyte was in fluid communication with a tank (80) for circulation thereof.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1, 2, 4-16 and 21-25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frischauf et al (WO 01/96631) in view Edson (US 4,585,539).

Frischauf et al teach (see figure 1 and abstract) utilizing a modular electrolytic cell design including a first container (14) containing a catholyte (16) and a cathode (18) and a second container (22), including an ion-exchange member (26), anolyte (28) and an anode (30), removably disposed within the first container (14). The apparatus of Frischauf et al was designed for electroplating of substrates.

Edson teaches (see at least col. 1, line 66 to col. 2, line 35 and col. 3, lines 16-19) that providing turbulent flow above a certain linear velocity adjacent a cathode in an electrodeposition process provided certain advantages such that the Nernst layer adjacent the cathode did not become depleted, thereby increasing the current density (i.e.-faster reaction rate) capable of being applied without adverse side effects.

One of ordinary skill in the art of electrochemistry would have realized that the electroplating process of Frischauf et al was equivalent to the recovery process of

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Edson because both result in a net deposition of material on the cathode from an electrolyte.

Therefore, it would have been obvious to one of ordinary skill in the art to have added circulation of electrolyte, in particular catholyte, to the apparatus of Frischauf et al as suggested by Edson for the purpose of increasing effective current density to thereby increase reaction rate. The circulation would have been achieved by adding a pump fluidly coupled to the first container and moving the catholyte across the cathode at a predetermined flow velocity.

With respect to the limitation that the catholyte comprises "a metal in complex with a complexing agent", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Frischauf et al in view of Edson teach an identical structure, which structure would have been capable of operating with a metal-complex containing solution.

Regarding claim 12, the cell of Frischauf et al included (as above) an anode, cathode and electrolyte, wherein the anode and cathode were positioned to form a flow path between them. Edson provides the suggestion to one of ordinary skill in the art to add a pump to the apparatus for the purpose of moving the electrolyte past the cathode with sufficient velocity to permit non-current limiting conditions for the deposition at the cathode.

Regarding claim 21, the cell of Frischauf et al included (as above) an anode, cathode and electrolyte, wherein the anode and cathode were positioned to form a flow path between them. Edson provides the suggestion to one of ordinary skill in the art to

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add a pump to the apparatus for the purpose of moving the electrolyte past the cathode with sufficient velocity to permit non-current limiting conditions for the deposition at the cathode.

With respect to the limitation that the catholyte comprises "a metal in complex with a complexing agent, wherein the metal is present in the electrolyte at a concentration of less than 5000 ppm", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Frischauf et al in view of Edson teach an identical structure, which structure would have been capable of operating with a metal-complex containing solution.

With respect to the limitation that the metal "is plated onto the cathode in form of a smooth film", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Frischauf et al in view of Edson teach an identical structure, which structure would have been capable of operating to form a smooth film of deposited metal.

Regarding claim 2, the container (14) of Frischauf et al would have been provided with an inlet for circulation of the catholyte through the pump of Edson. The first container of Frischauf et al already contained an outlet, the open top of the tank.

Regarding claim 4, this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Edson teaches an identical structure, which structure would have been capable of operating with a sulfuric acid and lead-EDTA complex solution.

Regarding claim 5, Edson teaches (see col. 5, lines 57-63) that when utilizing the structure of the cell for lead recovery from solutions, the cathode was selected to be titanium and the anode to be lead.

Regarding claim 6, Edson teaches (see figure 6) providing the anolyte to the anode chamber from an anolyte circulation tank (83). With respect to the limitation that the anolyte comprises "sulfuric acid", this limitation is related to the intended use of the claimed structure. See MPEP 2114 and 2115. Frischauf et al in view of Edson teaches an identical structure, which structure would have been capable of operating with a sulfuric acid solution as the anolyte.

Regarding claims 7 and 15, Frischauf et al teach (see page 6, lines 19-25) using an ion exchange polymer as the separator.

Regarding claims 8, 9, 23 and 24, Edson teaches (see col. 11, lines 4-19, particularly lines 13-15) that the apparatus was capable of operating to remove metal from the catholyte solution down to about 2 ppm.

Regarding claim 10, Edson teaches (see col. 3, lines 16-19) using a velocity of at least 3 feet per second (0.9144 m/sec).

Regarding claims 11, 22 and 25, the apparatus of Frischauf et al in view of Edson would have been capable of operating at conditions (different pump speed) such that the metal from the solution was deposited in any desired form, including a smooth film, a powdery deposit or a dendritic form.

Regarding claims 13 and 14, the cell of Frischauf et al (see at least figures 1 and 2) included a cathode disposed in a cathode container, an anode and anolyte disposed

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in an anode wherein the anode chamber is at least partially disposed in the cathode container. Edson et al provides the motivation for providing circulation of the catholyte and anolyte.

Regarding claim 16, it would have been obvious to one of ordinary skill in the art to have incorporated from the apparatus of Edson (see at least figure 6), a design such that catholyte was in fluid communication with a tank (80) for circulation thereof.

10. Claims 1, 2 and 4-16 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edson (US 4,585,539) in view of Applicant's admission of prior art and Kingsley et al (US 5,316,751).

If the limitation that the catholyte and anolyte comprises specific materials were to be given some patentable weight, then the teachings of Edson would be considered deficiently only for the lack of using a sulfuric acid plus lead-EDTA complex solution as the catholyte and sulfuric acid as the anolyte.

However, Applicant's admission of prior art, on page 1 of the specification clearly admits that formation of lead-EDTA solutions was known for treating lead-contaminated soils. Kingsley et al is disclosed as teaching the leaching of lead from soil using EDTA. Kingsley et al teach (see col. 10) that the formed solution included EDTA-complexed metal ions and sulfuric acid.

Since Edson teaches that the electrolytic cell was capable of operating to recover lead from solutions, even at low concentrations, one of ordinary skill in the art would have found it obvious to have used the lead-EDTA solution of Applicant's admission as

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the catholyte in the electrolytic cell of Edson for the purpose of recovering the lead from the contaminated soil.

Otherwise, all claims are rejected for identical reasons as stated above, with the following exceptions.

Regarding claim 4, Applicant's admission and Kingsley et al teach formation of a solution of sulfuric acid and lead complexed with EDTA.

Regarding claim 6, it would have been within the expected skill of a routineer in the art to have selected a compatible solution as the anolyte, which did not contain the decomposable EDTA, such as a sulfuric acid solution to prevent mixing of different anions between the anolyte and catholyte.

Allowable Subject Matter

11. Claims 17-20 are allowed.
12. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
13. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest the "triple nesting" of containers/tank required by these claims. The prior art effected recirculation of catholyte by including a tank separate from the electrolytic cell and providing piping to and from the separate tank. The prior art provides no suggestion for using an overflow pattern as is disclosed by Applicant, or equivalents thereof, where the electrolytic cell was contained within a

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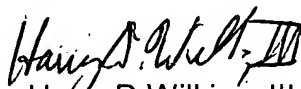
larger tank. Further, the prior art provides no teaching on how to maintain separate anolyte and catholyte by using the overflow of the cathode chamber.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw